

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-7 (previously canceled)

Claim 8 (currently amended): An optical device comprising:

a first I/O waveguide carrying an optical signal with a plurality of wavelengths;

a second I/O waveguide carrying a first wavelength of the plurality of wavelengths;

a third I/O waveguide carrying a second wavelength of the plurality of wavelengths;

a first single-side-pass filter optically coupled to the first I/O waveguide, wherein the first single-side-pass filter reflects the first wavelength between the first I/O waveguide and the second I/O waveguide, and the first single-side-pass filter passes the second wavelength between the first I/O waveguide and the third I/O waveguide; and

a housing, and wherein

the first I/O waveguide extends outwardly from the housing, and wherein

the first single-side-pass filter is mounted in the housing, and wherein

the first single-side-pass filter is a short-pass filter, and wherein

the first single-side-pass filter includes a transparent substrate on which several thin layers of different types of metal have been deposited by a sputtering technique.

Claim 9 (currently amended): An optical device comprising:

a first I/O waveguide carrying an optical signal with a plurality of wavelengths;

a second I/O waveguide carrying a first wavelength of the plurality of wavelengths;

a third I/O waveguide carrying a second wavelength of the plurality of wavelengths;

a first single-side-pass filter optically coupled to the first I/O waveguide, wherein the first single-side-pass filter reflects the first wavelength between the first I/O waveguide and the second I/O waveguide, and the first single-side-pass filter passes the second wavelength between the first I/O waveguide and the third I/O waveguide;

a first collimator assembly comprising a first GRIN lens, a fourth waveguide, and a fifth waveguide, and wherein the first GRIN lens is optically coupled to the first single-side-pass filter, the fourth waveguide optically coupled to the first I/O waveguide, and the fifth waveguide optically coupled to the second I/O waveguide, wherein the first single-side-pass filter reflects the first wavelength between the first I/O waveguide and the second I/O waveguide through the fifth waveguide of the first collimator assembly;

a second collimator assembly comprising a second GRIN lens, and a sixth waveguide, and wherein the second GRIN lens is optically coupled to the first single-side-pass filter, and wherein the first single-side-pass filter passes the second wavelength between the first I/O waveguide and the third I/O waveguide through the sixth waveguide of the second collimator assembly;

a third collimator assembly comprising a third GRIN lens, a seventh waveguide, and an eighth waveguide, and wherein the seventh waveguide is optically coupled to the fifth waveguide of the first collimator assembly;

a fourth collimator assembly comprising a fourth GRIN lens, and a ninth waveguide;

a second single-side-pass filter optically coupled to the third GRIN lens of the third collimator assembly and the fourth GRIN lens of the fourth collimator assembly, wherein the second single-side-pass filter reflects a third wavelength of the plurality of wavelengths between the seventh waveguide of the third collimator assembly and the eighth waveguide of the third collimator assembly, and passes the first wavelength of the plurality of wavelengths between the seventh waveguide of the third collimator assembly and the ninth waveguide of the fourth collimator assembly;

a fifth collimator assembly comprising a fifth GRIN lens, a tenth waveguide, and an eleventh waveguide, and wherein the tenth waveguide is optically coupled to the sixth waveguide of the second collimator assembly;

a sixth collimator assembly comprising a sixth GRIN lens, and a twelfth waveguide;

a third single-side-pass filter optically coupled to the fifth GRIN lens of the fifth collimator assembly and the sixth GRIN lens of the sixth collimator assembly, wherein the third single-side-pass filter reflects a fourth wavelength of the plurality of wavelengths between the tenth waveguide of the fifth collimator assembly and the eleventh waveguide of the fifth collimator assembly, and passes the second wavelength between the tenth waveguide of the fifth collimator assembly and the twelfth waveguide of the sixth collimator assembly;

a housing, and wherein

the first I/O waveguide extends outwardly from the housing, and wherein
the first single-side-pass filter is mounted in the housing, and wherein
the second single-side-pass filter is mounted in the housing, and wherein
the third single-side-pass filter is mounted in the housing, and wherein
specified wavelengths for the first, second, and third single-side-pass filters are separated
by approximately 25.6 nanometers, and wherein

the first single-side-pass filter includes a transparent substrate on which several thin
layers of different types of metal have been deposited by a sputtering technique, and wherein

the first GRIN lens includes a transparent material having a cylindrical shape, and
wherein the cylindrical shape includes a center and an edge, and wherein the first GRIN lens has
a first index of refraction substantially equal to 1.52 at the center, and a second index of
refraction substantially equal to 1.55 at the edge.

Claim 10 (currently amended): An optical device comprising:

a first I/O waveguide carrying an optical signal with a plurality of wavelengths;
a second I/O waveguide carrying a first wavelength of the plurality of wavelengths;
a third I/O waveguide carrying a second wavelength of the plurality of wavelengths;
a first single-side-pass filter optically coupled to the first I/O waveguide, wherein the first
single-side-pass filter reflects the first wavelength between the first I/O waveguide and the
second I/O waveguide, and the first single-side-pass filter passes the second wavelength between
the first I/O waveguide and the third I/O waveguide;

a first collimator assembly comprising a first GRIN lens, a fourth waveguide, and a fifth waveguide, and wherein the first GRIN lens is optically coupled to the first single-side-pass filter, the fourth waveguide optically coupled to the first I/O waveguide, and the fifth waveguide optically coupled to the second I/O waveguide, wherein the first single-side-pass filter reflects the first wavelength between the first I/O waveguide and the second I/O waveguide through the fifth waveguide of the first collimator assembly;

a second collimator assembly comprising a second GRIN lens, and a sixth waveguide, and wherein the second GRIN lens is optically coupled to the first single-side-pass filter, and wherein the first single-side-pass filter passes the second wavelength between the first I/O waveguide and the third I/O waveguide through the sixth waveguide of the second collimator assembly;

a third collimator assembly comprising a third GRIN lens, a seventh waveguide, and an eighth waveguide, and wherein the seventh waveguide is optically coupled to the fifth waveguide of the first collimator assembly;

a fourth collimator assembly comprising a fourth GRIN lens, and a ninth waveguide;

a second single-side-pass filter optically coupled to the third GRIN lens of the third collimator assembly and the fourth GRIN lens of the fourth collimator assembly, wherein the second single-side-pass filter reflects a third wavelength of the plurality of wavelengths between the seventh waveguide of the third collimator assembly and the eighth waveguide of the third collimator assembly, and passes the first wavelength of the plurality of wavelengths between the seventh waveguide of the third collimator assembly and the ninth waveguide of the fourth collimator assembly;

a fifth collimator assembly comprising a fifth GRIN lens, a tenth waveguide, and an eleventh waveguide, and wherein the tenth waveguide is optically coupled to the sixth waveguide of the second collimator assembly;

a sixth collimator assembly comprising a sixth GRIN lens, and a twelfth waveguide;

a third single-side-pass filter optically coupled to the fifth GRIN lens of the fifth collimator assembly and the sixth GRIN lens of the sixth collimator assembly, wherein the third single-side-pass filter reflects a fourth wavelength of the plurality of wavelengths between the tenth waveguide of the fifth collimator assembly and the eleventh waveguide of the fifth collimator assembly, and passes the second wavelength between the tenth waveguide of the fifth collimator assembly and the twelfth waveguide of the sixth collimator assembly;

a housing, and wherein

the first I/O waveguide extends outwardly from the housing, and wherein

the first single-side-pass filter is mounted in the housing, and wherein

the second single-side-pass filter is mounted in the housing, and wherein

the third single-side-pass filter is mounted in the housing, and wherein

a specified wavelength of the first single-side-pass filter is approximately 1550.02 nanometers, a specified wavelength of the second single-side-pass filter is approximately 1524.38 nanometers, and a specified wavelength of the third single-side-pass filter is approximately 1575.62 nanometers, and wherein

the first single-side-pass filter includes a transparent substrate on which several thin layers of different types of metal have been deposited by a sputtering technique, and wherein

the first GRIN lens includes a transparent material having a cylindrical shape, and wherein the cylindrical shape includes a center and an edge, and wherein the first GRIN lens has a first index of refraction substantially equal to 1.52 at the center, and a second index of refraction substantially equal to 1.55 at the edge.

Claims 11-13 (previously canceled)

Claim 14 (currently amended): An optical device comprising:

- a first I/O waveguide carrying an optical signal with a plurality of wavelengths;
- a second I/O waveguide carrying a first wavelength of the plurality of wavelengths;
- a third I/O waveguide carrying a second wavelength of the plurality of wavelengths;
- a fourth I/O waveguide carrying a third wavelength of the plurality of wavelengths;
- a fifth I/O waveguide carrying a fourth wavelength of the plurality of wavelengths;
- a first single-side-pass filter optically coupled to the first I/O waveguide, wherein the first single-side-pass filter reflects the first wavelength between the first I/O waveguide and the second I/O waveguide, and the first single-side-pass filter passes the second wavelength between the first I/O waveguide and the third I/O waveguide;
- a second single-side-pass filter, wherein the second single-side-pass filter reflects the third wavelength between the first I/O waveguide and the fourth I/O waveguide and passes the second wavelength between the first I/O waveguide and the third I/O waveguide;

a third single-side-pass filter, wherein the third single-side-pass filter reflects the fourth wavelength between the first I/O waveguide and the fifth I/O waveguide and passes the second wavelength between the first I/O waveguide and the third I/O waveguide; and

a housing, and wherein

the first I/O waveguide extends outwardly from the housing, and wherein

the first single-side-pass filter is mounted in the housing, and wherein

the second single-side-pass filter is mounted in the housing, and wherein

the third single-side-pass filter is mounted in the housing, and wherein

the first, second, and third single-side-pass filters are separated by approximately 25.6 nanometers, and wherein

the first single-side-pass filter includes a transparent substrate on which several thin layers of different types of metal have been deposited by a sputtering technique.

Claims 15-17 (previously canceled)

Claim 18 (currently amended): An optical device comprising:

a first I/O waveguide carrying an optical signal with a plurality of wavelengths;

a second I/O waveguide carrying a first wavelength of the plurality of wavelengths;

a third I/O waveguide carrying a second wavelength of the plurality of wavelengths;

a first single-side-pass filter optically coupled to the first I/O waveguide, wherein the first single-side-pass filter reflects the first wavelength between the first I/O waveguide and the

second I/O waveguide, and the first single-side-pass filter passes the second wavelength between the first I/O waveguide and the third I/O waveguide; and

a housing, and wherein

the first I/O waveguide extends outwardly from the housing, and wherein

the first single-side-pass filter is mounted in the housing, and wherein

the first single-side-pass filter is curved, and wherein

the first single-side-pass filter includes a transparent substrate on which several thin layers of different types of metal have been deposited by a sputtering technique.

Claims 19-20 (previously canceled)